

Order of Operations

When an expression contains more than one operation or makes use of grouping symbols, such as parentheses, follow the correct **order of operations** in order to simplify the expression.

Order of Operations:

1. Complete operations in parentheses or brackets.
2. Complete operations with exponents.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

EXAMPLE

Simplify.

$$6 + (11 - 7)^2 - 1$$

$$6 + (11 - 7)^2 - 1 = 6 + (4)^2 - 1 \quad \text{Evaluate inside the parentheses first.}$$

$$= 6 + 16 - 1 \quad \text{Complete the operation with the exponent.}$$

$$4^2 = 4 \times 4 = 16$$

$$= 22 - 1 \quad \text{Add and subtract from left to right.}$$

$$= 21$$

PRACTICE

Simplify.

| <i>a</i> | <i>b</i> | <i>c</i> |
|--|------------------------------|---|
| <p>1. $25 \div (3 + 2) \times 3$</p> $25 \div 5 \times 3 =$ $5 \times 3 =$ 15 | $42 - 2 \times (9 - 3) + 3$ | $50 - (35 - 10 \times 2)$ |
| <p>2. $63 \div 7 - 3 \times 2 + 4$</p> | $40 + 3 \times 5 - 8 \div 4$ | $(13 - 3) + 5 - 6$ |
| <p>3. $[(19 - 5) \div 2] \times 7$</p> | $8 + [(4 + 5) \times 2]$ | $[10 \times (27 - 11) \div 4] \times 3$ |

Why Should You Look Out for a Pig That Knows Karate?

Simplify or evaluate each expression below, as directed. Find your answer in the corresponding answer column. Write the letter of the exercise in the box that contains the number of the answer.



SIMPLIFY:

- I $4 \cdot 9 + 1$
 T $6 + 7 \cdot 10$
 U $42 - 2 \cdot 7$
 O $8 + 50 \div 2$
 E $(10)(3) - 4$
 G $2 \cdot 8 + 3 \cdot 5$
 A $\frac{60}{3} - (2)(4)$
 T $5 \cdot 12 + \frac{32}{16}$
 Y $3 + 2 \cdot 5 \cdot 8$
 I $(4)(6)(3) - 20 + 1$
 O $18 \div 2 \times 3$
 R $3 \cdot 3 + 4 \cdot 4 - 5 \cdot 5$

Answers:

- 7 62
 22 27
 9 37
 5 31
 17 33
 2 76
 15 12
 18 0
 12 83
 14 28
 1 53
 11 26

EVALUATE if $a = 2$, $b = 3$, $x = 5$, $y = 8$, and $w = 20$:

- I $4x + 7$
 C $1 + 6y$
 H $9 - 2b$
 O $8x + 3y$
 M $a + bw$
 V $aw - by$
 P $b + \frac{w}{x}$
 G $\frac{bw}{x} - a + 7$
 K $abxy - 5w$
 H $36 - 4ab$
 P $5 + 3x - \frac{w}{a}$

Answers:

- 10 16
 16 10
 8 17
 20 49
 13 64
 21 12
 4 27
 23 7
 3 62
 19 140
 6 3

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|